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# COSMO Technical Note 2

## Health impacts and behaviours in the aftermath of COVID-19

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# Health impacts and behaviours in the aftermath of COVID-19

*Jake Anders, Xin Shao, James Yarde*

The COVID-19 pandemic affected the health of millions of people across the country. Young people's general health status and behaviours might be impacted by the COVID-19 pandemic. However, pupils' COVID infection rates and their other health behaviours differ depending upon individuals' characteristics, including gender, socioeconomic status and ethnicity. In this note, we first focus on the last of these, documenting differences in young people's COVID infection, their shielding status, their smoking, alcohol and drug use, and their exercise by their ethnic background.

Besides young people's health experiences, their education experiences have been significantly disrupted as a result of the COVID-19 pandemic. School closures were intermittent between March 2020 and March 2021 across early years, primary and post-primary education settings in the UK. Home schooling and online learning were direct consequences of school closures that placed unprecedented pressure on schools, teachers, pupils and parents. School closures and the online learning that followed placed technological expectations on pupils and parents, with socio-economic disparities and inequalities emerging according to technology access, internet access and a place to study in the home (Andrew et al., 2020; Green, 2020). Such expectations contributed to widening attainment disparities between pupils from different socio-economic backgrounds during the COVID-19 pandemic (Anders et al., 2021a; Cullinane & Montacute, 2020).

Besides young people's home learning experiences, their health status and experiences during the COVID-19 pandemic might have a further impact on their educational attainment. There is less evidence examining the associations between pupils' health status and experiences and their educational attainment, controlling for background characteristics. To fill this gap, we therefore, after examining young people's health status and behaviours by background, further explore the potential impact of pupils' COVID-19 health and other experiences, including their COVID infection rates and life event during the pandemic, on their' GCSE educational attainment, using data from Wave 1 of the COVID Social Mobility & Opportunities study (COSMO) linked with data from the National Pupil Database (NPD) for COSMO cohort members who provided consent for this linkage (~75% of the cohort).

**Data and analysis**

This note uses data from COSMO Wave 1 linked with the Department for Education's National Pupil Database. COSMO participants are a stratified, clustered probability sample of young people who were in Year 11 in academic year

2020/21, who then participated in the Wave 1 survey in academic year 2021/22, along with a main parent respondent. Weights are applied to the analysis to account for over-sampling of disadvantaged harder-to-reach groups and initial non-response by young people (where analysis is based on a young person report) or young people and their parents (where analysis is based on a parental report).

**Table 1. Percentage of sample in each ethnic group**

| **Ethnic Group** | **%** |
|---|---|
| White | 76 |
| Mixed | 5 |
| Asian | 11 |
| Black | 6 |
| Other | 2 |
| **Total** | 100 |

*Notes*. Analysis is weighted to account for sampling design and non-response. N=10,089.

Aspects of this analysis use administrative data from the Department for Education (DfE)'s National Pupil Database (NPD), where consent was gained for this linkage (73% of young people), with additional weighting carried out to ensure (insofar as is possible) representativeness of analysis using linked administrative data. This work was produced using statistical data from the DfE processed in the Office for National Statistics' (ONS) Secure Research Service (SRS). The use of the DfE statistical data in this work does not imply the endorsement of the DfE or ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets, which may not exactly reproduce National Statistics aggregates.

Our analyses first all look at percentages or means of the sample across a range of outcome measures, stratified by their ethnic background based on the major ethnic group variable available in the NPD pupil-level census dataset. Specifically, we look across the following outcome measures:

- COVID infection rate
- Severity of COVID infection with long term symptoms
- Shielding status
- Smoking, alcohol and drug use
- Doing sports or exercise before and after the COVID-19 pandemic

For the second part of this note, which focuses on the link between young people's COVID-19 health experiences and life events and educational attainment, our analyses adopt the value-added approach and build OLS linear regression models

to evaluate the association between COVID-19 related experiences and young people's GCSE attainment. A strength of our analysis is that we link the COSMO survey data to administrative records from the National Pupil Database (NPD), enabling us to control for pupils' socio-economic background and their prior Key Stage (KS) 2 educational attainment.

As our focus is on pupils' COVID-19 related experiences, the specific variables that we are interested in are:

- Young people's COVID status and shielding status
- The severity of young people's long COVID
- The life events that young people experienced during the COVID-19 pandemic

In order to explore the associations between pupils' health and other life experiences during the COVID-19 pandemic and their GCSE educational attainment, attempting to decompose the possible influence of gender, ethnicity, socio-economic status (SES), and prior attainment, we fit linear regression models to control for different sets of covariates at each stage. In this way, we are able to examine whether and the extent to which young people's their overall academic performance in KS4 can be explained by COVID-19 related experiences, taking into account pupils' background characteristics and prior attainment.

As such, first, Model 0, which only includes the focus COVID-19 related variable, is built. This performs the important function of examining how young people's COVID-19 experiences predict the GCSE attainments on their own. We use full sample size for Model 0 for comparability with the descriptive analysis results.

Model 1 also includes the focus COVID-19 related variable only, but restricts the sample size to regression sample size. From Model 1 onwards, covariates (demographics, SES, and KS2 attainment) included in the model are added in a sequential manner (see Figure 1), and we use consistent regression sample size. This provides results on the conditional association between pupils' COVID-19 experiences and their educational attainment after controlling for prior factors. And in this way, we are able to understand the relationships through comparing the results to those from the previous model.

Pupils' prior educational attainment is based on their performance in KS2 tests in reading, maths, and Grammar, Punctuation and Spelling (GPS). We standardise these three variables to be Z-scores (i.e. mean of zero, standard deviation of one) to aid interpretation.

The outcome of interest in all models is pupils' total GCSE point scores as an indicator of educational attainment in KS4. Again, we standardise this outcome variable to be a Z-score, with mean of zero and standard deviation of one to aid

interpretation. Therefore, our outcome variable is teacher assessed overall KS4 standardised score (Z-score).

Figure 1 below summarises how the models are built and the function(s) of each model.

**Figure 1 Linear regression model approach**

| Model | Independent variable(s) included in the model | Sample | Function(s) of the model |
|---|---|---|---|
| **Model 0** | The focus COVID-19 related variable | Full sample | • to examine how young people's COVID-19 experiences predict the GCSE attainment on their own<br>• to compare the results with the descriptive analysis results as explored in the first part of this note |
| **Model 1** | The focus COVID-19 related variable | Regression analysis sample | • to explore how young people's COVID-19 experiences predict the GCSE attainment on their own for the regression analysis sample |
| **Model 2** | Model 1 + demographics (gender, ethnicity) | Regression analysis sample | • to explore how young people's COVID-19 experiences predict the GCSE attainment when their birth characteristics are controlled for |
| **Model 3** | Model 2 + SES (parental education, parental occupation) | Regression analysis sample | • to explore how young people's COVID-19 experience predicts the GCSE attainment when both their birth characteristics and SES are controlled for |

| | | | |
|---|---|---|---|
| **Model 4** | Model 3 + KS2 attainment (individual KS2 standardised scores (Z-scores) ) | Regression analysis sample | • to explore how COVID-19 experience predicts the GCSE attainment for pupils with the same background and same baseline educational attainment |
| **Model 5** (for some focus variables) | Model 4 + Correlated focus variables | Regression analysis sample | • to explore how COVID-19 experience predicts the GCSE attainment for pupils with the same background and same baseline educational attainment, conditional on correlated COVID experiences |

It is important to point here that for COSMO cohort, their KS4 educational attainment is based on teacher assessment. Due to the disruption of the COVID-19 pandemic, GCSE exam cancellation were experienced for COMSO cohort. In England, final grades were primarily provided according to an algorithm established by Ofqual. However, following criticisms of such algorithm due to inaccuracies in the awarded grades (Kelly, 2021; Paulden, 2020), grades were instead based on teacher predicted outcomes, historical data on school performance and cohort-level prior performance data (Centre Assessed Grades [CAGs]). This method was also met with criticism due to disparities according to pupil characteristics such as socio-economic background (Anders et al., 2021b; Kelly, 2021; Murphy & Wyness, 2020; Paulden, 2020). Studies also highlighted pupils' feelings of uncertainty, confusion and anxiety about exam cancellations as well as a desire for more information on how the system would work to calculate grades and how this would be done fairly (Huband-Thompson et al., 2021; Mylona & Jenkins, 2021). Pupils also highlighted their concern about the legitimacy of their awarded grades (Huband-Thompson et al., 2021).

## Results

### Differences in health impact by ethnicity

We begin by exploring reported COVID-19 infection rates by ethnic group (Table 2), finding higher COVID-19 infection rates among mixed, Asian and white young people.

**Table 2. Percentage of young people who reported having had COVID-19 by ethnicity**

| Ethnicity | Definitely had it - positive test (%) | Probably had it - no positive test (%) | Probably not had it (%) | Definitely not had it (%) | Total |
|---|---|---|---|---|---|
| White | 30.0 | 19.7 | 24.2 | 26.1 | 100 |
| Mixed | 33.2 | 16.7 | 24.5 | 25.6 | 100 |
| Asian | 31.2 | 17.1 | 18.1 | 33.6 | 100 |
| Black | 24.0 | 17.8 | 16.8 | 41.4 | 100 |
| Other | 27.4 | 18.6 | 19.5 | 34.6 | 100 |
| **Overall** | 29.9 | 18.7 | 21.8 | 29.5 | 100 |

*Notes*. Reporting row percentages. Analysis is weighted to account for sampling design and non-response. N = 9,613.

Turning next to young people who have or had COVID with long term symptoms (long COVID), we examine the severity of young people's long COVID (Table 3), indicated by the extent to which the long COVID reduced young people's ability to carry out day-to-day activities. Long COVID – defined as when an individual who suffered from a COVID-19 infection experienced symptoms more than 4 weeks after they first had the virus, which were not explained by something else – emerged as an additional risk from COVID-19 infection. Black young people were the more likely to report that they had severe long COVID, while those from a Mixed or 'Other' background were more likely to report having had mild long COVID compared to their peers.

**Table 3. Percentage of young people who reported having had severe long COVID by ethnicity**

| Ethnicity | Long COVID reduced activity ability a lot (%) | Long COVID reduced activity ability a little (%) | Long COVID made no difference to activity ability (%) | Total (%) |
|---|---|---|---|---|
| White | 26.1 | 43.8 | 30.0 | 100 |
| Asian | 29.2 | 46.5 | 24.2 | 100 |
| Black | 32.4 | 37.7 | 29.9 | 100 |
| Mixed/Other | 23.2 | 55.7 | 21.1 | 100 |
| **Overall** | 27.8 | 44.8 | 27.4 | 100 |

*Notes.* Reporting row percentages. Analysis is weighted to account for sampling design and non-response. The 'Mixed' and 'Other' ethnic groups are combined in a single category for statistical disclosure control reasons. N = 831.

We then looked at young people's shielding status by ethnicity (Table 4). White and mixed young people were less likely to report that they had been asked to shield than pupils from other ethnic groups. Meanwhile, pupils in the "other" ethnic group was the most likely to be asked to shield.

**Table 4. Percentage of young people who reported being asked to shield by ethnicity**

| Ethnicity | No (%) | Yes (%) | Total (%) |
|---|---|---|---|
| White | 93.4 | 6.6 | 100 |
| Mixed | 92.1 | 7.9 | 100 |
| Asian | 87.8 | 12.2 | 100 |
| Black | 89.0 | 11.0 | 100 |
| Other | 84.2 | 15.8 | 100 |
| **Overall** | 91.4 | 8.6 | 100 |

*Notes*. Reporting row percentages. Analysis is weighted to account for sampling design and non-response. N = 9,512.

Moving from COVID related health behaviour, we now look at young people's general health behaviours during the COVID-19 pandemic. We explore young people's use of cigarettes by ethnicity first (Table 5). Asian and black young people were more likely to report that they were never-smokers than pupils from other ethnic groups. Meanwhile, white pupils were the least likely to report that they were never-smokers. White young people were also the most likely to report that they were previous/current smokers than those from other ethnic groups.

**Table 5. Percentage of young people smoking cigarettes by ethnicity**

| Ethnicity | Have never smoked cigarettes (%) | Have only ever tried cigarettes once (%) | Previous/current smoker (%) | Total (%) |
|---|---|---|---|---|
| White | 72.7 | 12.3 | 15.0 | 100 |
| Mixed | 77.2 | 11.8 | 11.1 | 100 |
| Asian | 94.9 | 3.2 | 1.9 | 100 |
| Black | 92.5 | 4.8 | 2.7 | 100 |
| Other | 86.5 | 8.1 | 5.4 | 100 |
| **Overall** | 78.2 | 10.2 | 11.6 | 100 |

*Notes*. Reporting row percentages. Analysis is weighted to account for sampling design and non-response. N = 9,512.

As use of e-cigarettes among young people in the UK has risen since 2018, we also explore their use among the COSMO cohort, by ethnicity. As shown in Table 6, compared to the overall picture of young people's use of traditional cigarettes, the general pattern of using e-cigarettes shows a similar story. Again, Asian and black young people were more likely to report that they never used an e-cigarette. White and mixed young people were the least likely to report so and they were also the most likely to report that they either had only tried e-cigarettes once or they were precious or current e-cigarette users.

**Table 6. Percentage of young people using e-cigarettes by ethnicity**

| **Ethnicity** | **Have never used an e-cigarette (%)** | **Have only ever tried an e-cigarette once (%)** | **Previous/current e-cigarette user (%)** | **Total (%)** |
|---|---|---|---|---|
| White | 61.8 | 15.2 | 23.1 | 100 |
| Mixed | 63.4 | 16.8 | 19.8 | 100 |
| Asian | 86.5 | 5.8 | 7.6 | 100 |
| Black | 81.8 | 9.4 | 8.9 | 100 |
| Other | 82.5 | 8.3 | 9.1 | 100 |
| **Overall** | 68.1 | 12.8 | 19.2 | 100 |

*Notes*. Reporting row percentages. Analysis is weighted to account for sampling design and non-response. N = 9,466.

Moving from young people's smoking and vaping behaviour, we now look at their drinking behaviour. There is a big gap in whether young people drink alcohol by ethnicity (Table 7). Young people from either White or Mixed backgrounds were far more likely to report that they had ever had an alcoholic drink than other ethnic groups. Asian pupils were the least likely to report so. For example, the proportion of white young people who reported having had alcoholic drink is about 60 percentage points higher than that of Asian young people who reported so.

**Table 7. Percentage of young people who have <u>ever</u> drunk alcohol by ethnicity**

| **Ethnicity** | **Yes (%)** | **No (%)** | Total (%) |
|---|---|---|---|
| White | 76.2 | 23.8 | 100 |
| Mixed | 59.6 | 40.4 | 100 |
| Asian | 16.0 | 84.0 | 100 |

| | | | |
|---|---|---|---|
| Black | 28.8 | 71.2 | 100 |
| Other | 28.3 | 71.7 | 100 |
| **Overall** | 57.4 | 42.6 | 100 |

Notes. Reporting row percentages. Analysis is weighted to account for sampling design and non-response. N = 9,610.

We continue to explore the frequency of young people drinking alcohol by ethnicity (Table 8), only those who have ever had a drink were asked it. In general, white young people reported having had alcoholic drink more frequently than pupils from other ethnic groups.

**Table 8. Percentage of the frequency of young people drinking alcohol by ethnicity**

| **Ethnicity** | **Never (%)** | **Once a month or less (%)** | **2 to 3 times a month (%)** | **At least Weekly (%)** | **Total (%)** |
|---|---|---|---|---|---|
| White | 6.0 | 51.5 | 32.5 | 10.1 | 100 |
| Mixed | 8.0 | 62.3 | 23.3 | 6.4 | 100 |
| Asian/Black/Other | 20.3 | 61.4 | 15.0 | 3.3 | 100 |
| **Overall** | 8.3 | 54.4 | 28.6 | 8.7 | 100 |

*Notes.* Reporting row percentages. Analysis is weighted to account for sampling design and non-response. The 'Asian,' 'Black' and 'other' ethnic groups are combined in a single category for statistical disclosure control reasons. N = 5,290.

Looking at young people's use of drugs by ethnicity (Table 9), there is also a big gap. White and mixed pupils were far more likely to use drugs compared to pupils from other ethnic groups. For example, the proportion of white young people who reported having used drugs is approximately 15 percentage points higher than that of Asian young people who reported so.

**Table 9. Percentage of young people using drugs by ethnicity**

| **Ethnicity** | No (%) | Yes (%) | Total (%) |
|---|---|---|---|
| White | 81.3 | 18.7 | 100 |
| Mixed | 83.1 | 16.9 | 100 |
| Asian | 96.2 | 3.8 | 100 |
| Black | 92.3 | 7.7 | 100 |
| Other | 95.3 | 4.7 | 100 |
| **Overall** | 85.5 | 14.5 | 100 |

*Notes*. Reporting row percentages. Analysis is weighted to account for sampling design and non-response. N=9,444.

Finally, we look at young people taking part in sports or exercise outside of PE lessons before and after the COVID-19 pandemic by ethnicity (Table 10). In general, pupils were less likely to take part in sports or exercise after COVID-19 pandemic compared to pre-pandemic. It is interesting that while black young people were the most likely to take part in doing sports or exercise before the COVID-19 pandemic, they were less likely to do so than white, mixed and pupils from "other" ethnic groups after the COVID-19 pandemic. Black pupils doing sports or exercises outside PE lessons fell by 21 percentage points (from 65% taking part pre-pandemic to 44% post).

**Table 10 Percentage of young people doing sports or exercise outside of PE before (Year 10) and after (Year 11) COVID-19 pandemic by ethnicity**

| Ethnicity | Before COVID-19 pandemic/ Year 10 | | | After COVID-19 pandemic/ Year 11 | | |
|---|---|---|---|---|---|---|
| | No (%) | Yes (%) | Total (%) | No (%) | Yes (%) | Total (%) |
| **White** | 38.5 | 61.5 | 100 | 54.9 | 45.1 | 100 |
| **Mixed** | 37.7 | 62.3 | 100 | 53.0 | 47.0 | 100 |
| **Asian** | 43.0 | 57.0 | 100 | 58.8 | 41.2 | 100 |
| **Black** | 35.5 | 64.5 | 100 | 56.1 | 43.9 | 100 |
| **Other** | 40.1 | 59.9 | 100 | 50.3 | 49.7 | 100 |
| **Overall** | 41.1 | 58.9 | 100 | 58.2 | 41.9 | 100 |

*Notes.* Reporting within year group row percentages. Analysis is weighted to account for sampling design and non-response. N = 5,094.

To explore this pattern in more depth, we compare Black pupils taking part in sports or exercises organised by school with that not organised by school before and after the COVID-19 pandemic (Table 11). Black pupils tended to be less likely to take part in sports or exercise both organised by school or not organised by school after the COVID-19 pandemic. However, there is a bigger decrease in them doing sports or exercise organised by school. It would be interesting to further explore whether the pandemic experience has had an impact on black young people taking part in sports or exercise and if so, in what ways.

**Table 11 Percentage of black pupils doing sports or exercise outside PE, before and after COVID-19 pandemic, by ethnicity**

| **Organised by school** | |
|---|---|
| **Pre-COVID (%)** | **After-COVID (%)** |
| 40 | 24 |
| **Not organised by school** | |
| **Pre-COVID** | **After-COVID** |

| (%) | (%) |
|---|---|
| 36 | 27 |

*Notes*. Analysis is weighted to account for sampling design and non-response. N = 5,094.

Our descriptive analysis so far indicates inequalities in young people's COVID status and general health behaviours during the COVID-19 pandemic by ethnicity. Their COVID-19 health status and experiences, which are shown to be stratified by ethnicity, might have an impact on their educational attainment. We therefore use regression models to further explore the potential impact of COVID-19 health and other experiences on young people's educational attainment, controlling for pupils' background characteristics including ethnicity and prior attainment. This is what the second part of this note focuses on.

## The potential impact of COVID-19 heath and other experiences on pupils' educational attainment

### *The relationship between young people's COVID-19 health experiences and their GCSE attainment*

First, we focus on young people's COVID-19 infection status, which is a health status directly related to COVID-19 pandemic. We explore the associations between young COVID-19 infection status during the COVID-19 pandemic and their overall Key Stage 4 performance (standardised teacher assessed total GCSE point score). Table 12 presents the detailed results of each stage of the regression models to show changes in coefficients when different sets of baseline variables are controlled for. Overall, after taking both background characteristics, prior educational attainment and pupils' shielding status (we add in shielding status here in the final model because it might act as a proxy for COVID-19 infection status) into account, having had COVID or long COVID makes little difference to pupils' teacher assessed GCSE attainment. Pupils' COVID-19 infection status is therefore a negligible factor in predicting pupils' educational attainment.

**Table 12 Associations between young people's COVID-19 infection status and teacher assessed GCSE attainment**

| | Model 0 | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|---|
| Young pupil had Covid (not include having had long COVID) | 0.07 (0.02)* | 0.07 (0.05) | 0.07 (0.04)* | 0.04 (0.22) | 0.03 (0.23) | 0.04 (0.08) |
| Young pupil has/had long | -0.02 (0.59) | -0.03 (0.56) | -0.04 (0.44) | -0.03 (0.56) | 0.00 (0.94) | 0.03 (0.40) |

| | | | | |
|---|---|---|---|---|
| COVID | | | | |
| Female | 0.31 (0.00)*** | 0.32 (0.00)*** | 0.23 (0.00)*** | 0.23 (0.00)*** |
| Mixed | 0.06 (0.42) | 0.02 (0.85) | -0.08 (0.38) | -0.08 (0.43) |
| Asian | 0.22 (0.00)*** | 0.34 (0.00)*** | 0.22 (0.00)*** | 0.23 (0.00)*** |
| Black | -0.11 (0.16) | -0.05 (0.49) | 0.03 (0.63) | 0.05 (0.31) |
| Other | 0.10 (0.48) | 0.20 (0.13) | 0.29 (0.00)** | 0.32 (0.00)*** |
| Degree holder | | 0.29 (0.00)*** | 0.08 (0.02)* | 0.08 (0.02)* |
| Higher managerial/professional occupation | | 0.51 (0.00)*** | 0.20 (0.00)*** | 0.19 (0.00)*** |
| Intermediate occupation | | 0.28 (0.00)*** | 0.13 (0.00)*** | 0.12 (0.00)** |
| Key Stage 2 attainment: scaled score in reading (Z-score) | | | 0.21 (0.00)*** | 0.21 (0.00)*** |
| Key Stage 2 attainment: scaled score in maths (Z-score) | | | 0.33 (0.00)*** | 0.33 (0.00)*** |

| | | | | | | |
|---|---|---|---|---|---|---|
| Key Stage 2 attainment: scaled score in GPS (Z-score) | | | | | 0.15 (0.00)*** | 0.15 (0.00)*** |
| Young pupil was asked to shield | | | | | | -0.29 (0.00)*** |
| *N* | 8857 | 4285 | 4285 | 4285 | 4285 | 4285 |
| $R^2$ | 0.001 | 0.001 | 0.035 | 0.145 | 0.553 | 0.559 |
| Residual DoF | 3850 | 2427 | 2427 | 2427 | 2427 | 2427 |

Reporting standardised regression coefficients
*p*-values in parentheses
DoF = Degrees of Freedom
GPS = Grammar, Punctuation and Spelling
$^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

The pattern focusing on young people's shielding status shows a different story. Looking at the association between pupils' shielding status on its own and their teacher assessed GCSE attainment (Table 13), we find that pupils having been asked to shield is associated with roughly a 0.6 standard deviation decrease in their GCSE scores. After adding covariates for pupils' background characteristics and prior attainment at KS2, this association becomes weaker, but pupils having been asked to shield is still linked with approximately 0.3 standard deviation decrease in their KS4 scores.

Considering pupils' COVID-19 infection status might act as a proxy for their shielding status, we added in pupils' COVID-19 status in the last model here. After further controlling pupils' COVID-19 infection status, shielding status is still associated with approximately 0.3 standard deviation drop in scores. This indicates that young people who were asked to shield achieved lower scores compared to those who were not asked to shield, other things equal.

This finding implies that the health risks of COVID-19 itself for young people are low, however, other factors relating to the disruption to young people's education (e.g. having been asked to shield) are the risky factors to their educational attainment.

**Table 13 Association between young people's shielding status and teacher assessed GCSE attainment**

| | Model 0 | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|---|
| Young pupil was asked to shield | -0.51 (0.00)*** | -0.55 (0.00)*** | -0.56 (0.00)*** | -0.46 (0.00)*** | -0.28 (0.00)*** | -0.29 (0.00)*** |
| Female | | | 0.31 (0.00)*** | 0.32 (0.00)*** | 0.23 (0.00)*** | 0.23 (0.00)*** |
| Mixed | | | 0.07 (0.33) | 0.03 (0.77) | -0.08 (0.43) | -0.08 (0.43) |
| Asian | | | 0.26 (0.00)*** | 0.37 (0.00)*** | 0.23 (0.00)*** | 0.23 (0.00)*** |
| Black | | | -0.05 (0.48) | -0.01 (0.93) | 0.05 (0.34) | 0.05 (0.31) |
| Other | | | 0.16 (0.23) | 0.25 (0.05) | 0.32 (0.00)*** | 0.32 (0.00)*** |
| Degree holder | | | | 0.28 (0.00)*** | 0.08 (0.02)* | 0.08 (0.02)* |
| Higher managerial/ professional occupation | | | | 0.49 (0.00)*** | 0.19 (0.00)*** | 0.19 (0.00)*** |
| Intermediate occupation | | | | 0.27 (0.00)*** | 0.12 (0.00)*** | 0.12 (0.00)** |
| Key Stage 2 attainment: scaled score in reading (Z-score) | | | | | 0.21 (0.00)*** | 0.21 (0.00)*** |
| Key Stage 2 attainment: | | | | | 0.33 (0.00)*** | 0.33 (0.00)*** |

| | | | | | | |
|---|---|---|---|---|---|---|
| scaled score in maths (Z-score) | | | | | | |
| Key Stage 2 attainment: scaled score in GPS (Z-score) | | | | | 0.15 (0.00)*** | 0.15 (0.00)*** |
| Young pupil had Covid (not include having had long COVID) | | | | | | 0.04 (0.08) |
| Young pupil has/had long COVID | | | | | | 0.03 (0.40) |
| *N* | 8806 | 4285 | 4285 | 4285 | 4285 | 4285 |
| $R^2$ | 0.018 | 0.022 | 0.056 | 0.159 | 0.558 | 0.559 |
| Residual DoF | 3819 | 2427 | 2427 | 2427 | 2427 | 2427 |

Reporting standardised regression coefficients
*p*-values in parentheses
DoF = Degrees of Freedom
GPS = Grammar, Punctuation and Spelling
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

After exploring the link between young people's general COVID-19 status and their teacher assessed KS4 performance, we then focus on whether the level of the severity of young people's COVID with long-term symptoms (long-COVID) has any association with their teacher assessed GCSE attainment (Table 14). The level of severity of young people's long COVID is indicated by how long COVID reduced pupils' ability to carry out day-to-day activities compared with the time before they had COVID-19.

As shown in Table 14, having long COVID with no effect or some effect on everyday life is not associated with their GCSE attainment. This implies that comparing pupils with similar characteristics and same baseline educational attainment,

those having had long COVID with either no or some effect on everyday life makes little difference to their teacher assessed KS4 performance. However, having long COVID with a severe effect on everyday life are consistently associated with lower GCSE scores. Having severe long COVID is linked with about 0.3 standard deviation decrease in teacher assessed GCSE scores. This association remains roughly at -0.3 when pupils' birth characteristics and family background factors are added in. After further controlling for pupils' prior attainment, the association becomes smaller, but is still about -0.2 standard deviations.

The findings show that pupils with long COVID with a severe effect on everyday life achieved lower GCSE scores than their peers who did not suffer from this experience, when all other variables are held constant. Severe long COVID, therefore, is a risky factor for young people's educational attainment. The long-term disruption to young people's education, daily life and potentially mental health might be a possible explanation for this pattern.

**Table 14 Associations between severity of young people's long COVID and their teacher assessed GCSE attainment**

| | Model 0 | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|---|
| Had COVID | 0.07 (0.02)* | 0.06 (0.05) | 0.06 (0.05) | 0.04 (0.22) | 0.03 (0.24) |
| Had COVID with long-term symptoms, but no effect on everyday life | 0.15 (0.07) | 0.13 (0.14) | 0.13 (0.11) | 0.12 (0.15) | 0.04 (0.44) |
| Had COVID with long-term symptoms, with some effect on everyday life | 0.02 (0.68) | 0.01 (0.93) | 0.00 (1.00) | -0.01 (0.90) | 0.06 (0.24) |
| Had COVID with long-term | -0.27 (0.00)** | -0.31 (0.00)** | -0.34 (0.00)** | -0.26 (0.01)* | -0.16 (0.01)* |

| | | | |
|---|---|---|---|
| symptoms, with a severe effect on everyday life | | | |
| Female | 0.32 (0.00)*** | 0.33 (0.00)*** | 0.23 (0.00)*** |
| Mixed | 0.04 (0.57) | 0.01 (0.87) | -0.07 (0.43) |
| Asian | 0.22 (0.00)*** | 0.34 (0.00)*** | 0.22 (0.00)*** |
| Black | -0.12 (0.10) | -0.06 (0.39) | 0.02 (0.68) |
| Other | 0.05 (0.71) | 0.18 (0.14) | 0.29 (0.00)*** |
| Degree holder | | 0.29 (0.00)*** | 0.08 (0.02)* |
| Higher managerial/ professional occupation | | 0.50 (0.00)*** | 0.20 (0.00)*** |
| Intermediate occupation | | 0.28 (0.00)*** | 0.13 (0.00)*** |
| Key Stage 2 attainment: scaled score in reading (Z-score) | | | 0.21 (0.00)*** |
| Key Stage 2 | | | 0.33 |

| | | | | | |
|---|---|---|---|---|---|
| attainment: scaled score in maths (Z-score) | | | | | (0.00)*** |
| Key Stage 2 attainment: scaled score in GPS (Z-score) | | | | | 0.16 (0.00)*** |
| *N* | 8828 | 4398 | 4398 | 4398 | 4398 |
| $R^2$ | 0.004 | 0.004 | 0.039 | 0.149 | 0.557 |
| Residual DoF | 3840 | 2476 | 2476 | 2476 | 2476 |

Reporting standardised regression coefficients
*p*-values in parentheses
DoF = Degrees of Freedom
GPS = Grammar, Punctuation and Spelling
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Moving from exploring the potential impact of young people's COVID-19 (including long COVID) on educational attainment, we now examine the relationship between the life events that young people experienced during the COVID-19 pandemic and their GCSE attainment.

The COSMO survey collects information on whether young people have experienced some negative life events during the COVID-19 pandemic , including a parent/guardian or carer lost their job or business, young people's family could not afford to buy enough food or had to use food bank (food poverty), young people's family could not afford to pay their bills, rent or mortgage (financial difficulties), young people were seriously ill in hospital (not only due to COVID-19) and young people's close family member or friend died (not only due to COVID-19).

We begin to look at the link between whether young people experienced at least one of the life events and their GCSE attainment (Table 15). Table 3 shows that the experience of at least one life event in general has little effect on their teacher assessed GCSE attainment. The next question is whether any specific life event makes a difference to young people's KS4 attainment, especially after controlling for their background characteristics and prior educational attainment.

**Table 15 Associations between COVID-19 life event and teacher assessed GCSE attainment**

| | Model 0 | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|---|
| Had at least one of the life events | 0.07 (0.01)** | 0.07 (0.06) | 0.02 (0.56) | 0.03 (0.38) | -0.03 (0.28) |
| Female | | | 0.32 (0.00)*** | 0.33 (0.00)*** | 0.24 (0.00)*** |
| Mixed | | | 0.08 (0.27) | 0.04 (0.63) | -0.06 (0.52) |
| Asian | | | 0.20 (0.00)*** | 0.32 (0.00)*** | 0.23 (0.00)*** |
| Black | | | -0.08 (0.22) | -0.02 (0.74) | 0.04 (0.40) |
| Other | | | 0.06 (0.69) | 0.17 (0.20) | 0.27 (0.00)** |
| Degree holder | | | | 0.29 (0.00)*** | 0.09 (0.02)* |
| Higher managerial/ professional occupation | | | | 0.49 (0.00)*** | 0.19 (0.00)*** |
| Intermediate occupation | | | | 0.26 (0.00)*** | 0.12 (0.00)*** |
| Key Stage 2 attainment: scaled score in reading (Z-score) | | | | | 0.21 (0.00)*** |

| | | | | | |
|---|---|---|---|---|---|
| Key Stage 2 attainment: scaled score in maths (Z-score) | | | | | 0.33 (0.00)*** |
| Key Stage 2 attainment: scaled score in GPS (Z-score) | | | | | 0.16 (0.00)*** |
| *N* | 8539 | 4335 | 4335 | 4335 | 4335 |
| $R^2$ | 0.001 | 0.001 | 0.035 | 0.140 | 0.553 |
| Residual DoF | 3735 | 2442 | 2442 | 2442 | 2442 |

Reporting standardised regression coefficients
*p*-values in parentheses
DoF = Degrees of Freedom
GPS = Grammar, Punctuation and Spelling
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As shown in Table 16, we next consider the association between variables indicating specific life events as mentioned above. Among all the life events, the link is the strongest between young people having experienced food poverty and teacher assessed KS4 scores. Compared to those who did not experience food poverty during the COVID-19 pandemic, young people whose families could not afford to buy enough food or who had to use a food bank is associated with 0.6 standard deviation lower teacher assessed total GCSE score. When adding pupils' background characteristics and prior attainment in life order, this link gradually becomes weaker. However, young people experiencing food poverty is still associated with a 0.3 standard deviation decrease in total GCSE score, other things equal.

Pupils whose family not being afford to pay their bills, rent or mortgage during the COVID-19 pandemic had lower GSCE scores, compared to those whose family not having these financial difficulties. However, once fuller pupil biographies and prior attainment have been taken into account, the correlation becomes negligible and not significant.

The pattern for pupils having being serious illness in hospital (not only due to COVID-19) shows a different story. Although the effect of serious illness in hospital on educational attainment is not significant on its own, after controlling for pupils' background characteristics and prior attainment, it is shown to be negatively linked to pupils' GCSE scores. Young people pupils being seriously ill in hospital during the COVID-19 pandemic is linked to a 0.3 standard deviation decrease in total teacher assessed GCSE score, other things equal.

**Table 16 Associations between COVID-19 life event and teacher assessed GCSE attainment**

| | Model 0 | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|---|
| Parent lost job | 0.04 | 0.08 | 0.07 | 0.09 | -0.02 |
| | (0.48) | (0.20) | (0.25) | (0.11) | (0.62) |
| Food poverty | -0.75 | -0.62 | -0.67 | -0.49 | -0.31 |
| | (0.00)*** | (0.00)*** | (0.00)*** | (0.00)*** | (0.00)*** |
| Financial difficulties | -0.04 | -0.18 | -0.16 | -0.10 | -0.07 |
| | (0.52) | (0.03)* | (0.04)* | (0.19) | (0.20) |
| Seriously ill | -0.16 | -0.19 | -0.29 | -0.27 | -0.22 |
| | (0.10) | (0.18) | (0.04)* | (0.04)* | (0.00)** |
| Family member/ friend died | 0.14 | 0.12 | 0.10 | 0.08 | 0.06 |
| | (0.00)*** | (0.00)** | (0.02)* | (0.04)* | (0.03)* |
| Female | | | 0.35 | 0.34 | 0.25 |
| | | | (0.00)*** | (0.00)*** | (0.00)*** |
| Mixed | | | 0.03 | 0.02 | -0.06 |
| | | | (0.68) | (0.77) | (0.51) |
| Asian | | | 0.22 | 0.33 | 0.22 |
| | | | (0.00)*** | (0.00)*** | (0.00)*** |
| Black | | | -0.07 | -0.03 | 0.04 |
| | | | (0.29) | (0.63) | (0.45) |

| | | | | | |
|---|---|---|---|---|---|
| Other | | | 0.10 (0.46) | 0.20 (0.11) | 0.31 (0.00)*** |
| Degree holder | | | | 0.29 (0.00)*** | 0.09 (0.01)* |
| Higher managerial/ professional occupation | | | | 0.48 (0.00)*** | 0.19 (0.00)*** |
| Intermediate occupation | | | | 0.27 (0.00)*** | 0.12 (0.00)*** |
| Key Stage 2 attainment: scaled score in reading (Z-score) | | | | | 0.20 (0.00)*** |
| Key Stage 2 attainment: scaled score in maths (Z-score) | | | | | 0.33 (0.00)*** |
| Key Stage 2 attainment: scaled score in GPS (Z-score) | | | | | 0.16 (0.00)*** |
| *N* | 9221 | 4577 | 4577 | 4577 | 4577 |
| $R^2$ | 0.031 | 0.027 | 0.066 | 0.163 | 0.564 |
| Residual DoF | 3938 | 2543 | 2543 | 2543 | 2543 |

Reporting standardised regression coefficients
*p*-values in parentheses
DoF = Degrees of Freedom
GPS = Grammar, Punctuation and Spelling

$^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

In sum, when looking at different life events separately, when pupils' background characteristics and prior educational attainment are controlled for, the experience of food poverty and financial difficulties (indicated by family could not pay bills) and young people having been seriously ill in hospital (not only due to COVID-19) are negatively associated with GCSE attainment. This is especially true for experiencing food poverty.

## Conclusion

This note has documented inequalities in young people's COVID status and general health behaviour during the COVID-19 pandemic depending upon their ethnicity. This highlights the importance of and need for consideration of such ethnic inequalities in policy and practice responses to the pandemic.

Our findings also reveal the potential negative effects of some COVID-19 health and other experiences of young people on their educational outcomes. After controlling for young people's background characteristics and their prior KS2 educational attainment, pupils who have or had severe long COVID, who were asked to shield, and who experienced food poverty and serious illness during the COVID-19 pandemic had lower GCSE scores compared to those who did not experience these. This is especially pronounced in terms of young people's shielding status and food poverty experiences. However, the regression models show that having had COVID itself makes little difference to pupils' GCSE attainment.

Our results imply that, while the health risks of COVID-19 itself for young people are low, other factors relating to the disruption to young people's education (e.g. having been asked to shield) and young people experiencing food poverty are shown to be risky for their educational attainment. These are the key factors in facing challenges to pupils' educational attainment during and after the COVID-19 pandemic. This highlights the importance of and need for consideration of reducing COVID-19 related disruption to pupils' education and daily life in policy and practice responses to the pandemic.

## Notes

This work was produced using statistical data from ONS. The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation

to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.

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